

<b>Office Action Summary</b>	<b>Application No.</b> 10/532,322	<b>Applicant(s)</b> YAMAMOTO ET AL.	
	<b>Examiner</b> EUGENIA WANG	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 33-63 is/are pending in the application.
- 4a) Of the above claim(s) 57-62 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 33-63 is/are rejected.
- 7) ☐ Claim(s) 39-41 and 43 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. <u>1/22/08</u> .                            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application  |
| Paper No(s)/Mail Date <u>7/25/05</u> .   | 6) <input type="checkbox"/> Other: ____.                           |

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 33-56 and 63, drawn to an organic electrolyte battery separator.

Group II, claim(s) 57-62, drawn to a method for producing an organic electrolyte battery separator.

2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The product of Group I does not require the special technical feature of being produced by method of Group II (namely the hydrophilic treatment and the particularly specified heat treatment). Likewise, the method of Group II does not require the special technical feature of Group I (namely the specified flow pore diameter and bubble point pore diameter). Accordingly, Groups I and II are not seen to encompass the same special technical feature.

3. During a telephone conversation with Curtis Hamre on January 22, 2008 a provisional election was made to prosecute the invention of Group I, claims 33-56 and 63. (During the telephonic conversation, it was not made clear whether or not the

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election was with or without traverse. Thus Examiner requires clarification with respect to this point upon response.) Affirmation of this election must be made by applicant in replying to this Office action. Claims 57-62 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

5. The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not

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commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

#### ***Priority***

6. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

#### ***Information Disclosure Statement***

7. The information disclosure statement filed July 25, 2005 has been placed in the application file and the information referred to therein has been considered as to the merits.

#### ***Specification***

8. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

#### ***Claim Objections***

9. Claim 39 is objected to because of the following informalities: the wording of the claim language is awkward, especially the portion reading "the fiber constituting the

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nonwoven composed the heat-and-humidity gelling resin and an olefin fiber.”

Appropriate correction is required.

10. Claims 40, 41, 43, 47, and 48 are objected to because of the following informalities: using the claim language “resin is assumed to be 100 parts by mass.” Examiner suggests using a weight ratio to properly claim the mass percentages. The usage of the word “assumed” is improper as it does not particularly limit a claim. For example, the claim language does not limit the separator in any way if the resin is not assumed to be 100 parts per mass. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 33-56 and 63 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claim 33 claims that the mean flow pore diameter is 0.3-5  $\mu\text{m}$  and that the bubble point pore diameter is between 3-20  $\mu\text{m}$ . However, the two ranges contradict what the mean flow pore diameter and bubble point pore diameter characterize. US 5,599,614 (Bahar et al.) is relied upon as an evidentiary piece to show how each term is defined within the art. Mean flow pore diameter is linked to the mean pore size, while the bubble point is linked to the maximum pore size (col. 9, lines 55-67; col. 10, lines 1-3). Therefore, without defining how the ranges correspond to one another (i.e. that a mean flow pore diameter

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corresponds to 0.3  $\mu\text{m}$  when the bubble point pore diameter corresponds to 3  $\mu\text{m}$ ), the ranges as defined are unclear, as it is uncertain how a mean flow pore diameter (average diameter) of 5  $\mu\text{m}$  can have a bubble point pore diameter (maximum pore size) of 3  $\mu\text{m}$ . Therefore, the ranges as applied to the structure of the separator are unclear and thus indefinite. Since claims 34-56 and 63 are dependent on claim 33, they are rejected for the same reason.

b. Claim 39 includes claim language is awkward, especially the portion reading "the fiber constituting the nonwoven composed the heat-and-humidity gelling resin and an olefin fiber." Due to the nature of the language, the relationship between the fiber constituting the nonwoven, the gelling resin, and olefin fiber is not clear. (Does the fiber constituting the nonwoven have both a gelling resin and an olefin fiber? Is the gelling resin of the nonwoven an olefin fiber?) Accordingly, the claim is viewed to be indefinite pending further clarification of the aforementioned relationship. Note: The following claim interpretation has been applied: "the fiber constituting the nonwoven composed of the heat-and-humidity gelling resin is an olefin fiber." This interpretation is taken, as the specification (p9, lines 25-26) note that the gelling resin is ethylene-vinyl alcohol copolymer (wherein ethylene is an olefin).

c. Claim 48 recites the limitation "the synthetic pulp" in line 10. There is insufficient antecedent basis for this limitation in the claim.

d. Claim 49 recites the limitation "the fiber" in line 1. There is insufficient antecedent basis for this limitation in the claim without the proper denoting of

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which fiber (the gelling fiber or the other fiber) is being denoted. Since claim 50 is dependent on claim 49, it is rejected for the same reason. Note: The following claim interpretation has been applied: that the fiber refers to the other fiber. This interpretation is taken in light of the specification (p 12, lines 27).

e. Claim 50 recites the limitation “the splittable composite fiber” in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 33-43, 49-51, 53-56, and 63 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over WO98/32184 (Tsukuda et al.), as evidenced by US 5,599,614 (Bahar et al.). Note: US 6511774 is relied upon as an English translation for WO document.

As to claim 33, Tsukuda et al. teach of a porous separator for a lithium battery, wherein a nonwoven fabric is embodied as the type of porous base (abs). The separator taught by Tsukuda et al. is for use in a lithium battery, which has an organic electrolyte, as the battery fabricated with the examples and comparative examples are made of LiClO<sub>4</sub>, ethylene carbonate, and diethylene carbonate (col. 51, lines 11-23). The porous base, wherein nonwoven fabric is embodied contains organic fibers (other fiber) such as polypropylene and polyethylene acrylic fibers (col. 9, lines 33-57). Tsukuda et al. also embodies the use of a binder (gelling resin) when fibrillated polymeric organic fibers (polyethylene and polypropylene fit into this description) are



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used, wherein a polyvinyl alcohol, such as ethylene-vinyl alcohol copolymer is embodied (col. 13, lines 8-29 and 62-67).

It is noted that the gelling resin (binder of Tsukuda et al.) (a) is capable of gelling by heating in the presence of moisture and another fiber and (b) does gel under these conditions.

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

In the case of the instant application the basis for expectation of inherency is: With respect to (a) that the same gelling resin and other fiber as defined in Tsukuda et al. above are embodied by the instant application (see p 9, lines 17-28; p 11, lines 1-15). (Note: It is interpreted that with the teaching of Tsukuda et al. that since ethylene-vinyl alcohol copolymer is a specific species in the generic polyvinyl alcohol species that

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all polyvinyl alcohols would act in the same manner under the same conditions, barring proof to the contrary.)

With respect to (b) same conditions of heat (by pressing) and humidity (water), as claimed, exist in Tsukuda et al., as water is included in the binder and that hot pressing occurs afterwards (see col. 13, lines 53-67; col. 17, lines 50-65).

The Examiner requires applicant to provide that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product.

Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

It is noted that the porous film has a maximum pore diameter of 10  $\mu\text{m}$ , as detected using ASTM F-316-80 bubble point method and nonwoven fabric base has a maximum pore diameter of 20  $\mu\text{m}$  (col. 5, lines 50-65).

It is noted that such a teaching inherently embodies a mean flow pore diameter of 0.3-5  $\mu\text{m}$  and a bubble point pore diameter of 3-20  $\mu\text{m}$  in accordance with ASTM F 316 86.

Although (c) the use of an ASTM F 316 86 standard is not specifically stated and (d) the mean flow pore diameter is not specifically stated, these two characteristics are seen as inherent.

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The basis for inherency is:

With respect to (c), the tests of ASTM F 316 86 and that of the used ASTM F-316-80 measure the same thing and would thus report bubble point values that are similar. Therefore, the bubble point diameters of Tsukuda et al. (with one specific data point at 4  $\mu\text{m}$ ) should be close to, if not identical to that of the claim.

With respect to (d), US 5,599,614 (Bahar et al.) is relied upon as an evidentiary piece. Bahar et al. is used to show what mean flow pore diameter and bubble point diameter correspond to. Mean flow pore diameter is linked to the mean pore size, while the bubble point is linked to the maximum pore size (col. 9, lines 55-67; col. 10, lines 1-3). It is noted that since both Tsukuda et al. and the instant application are made with similar materials (polyolefin other fibers and polyvinyl alcohol gelling resin) and in a similar manner (wherein the separator is heat pressed) that the characteristic of mean pore size would be expected to be similar. The bubble point displayed by Tsukuda et al., similar to that of the claimed instant application, is an indication of this. However, it is also noted that examples 120-124 particularly embody a nonwoven base with polypropylene/polyethylene combination fiber as well as a polyvinyl alcohol copolymer, wherein the separator has a final maximum pore diameter of 4  $\mu\text{m}$  as measured with the ASTM F-316-80 bubble point test (table 3; col. 47, lines 10-67; col. 48, lines 1-28). Accordingly, since the max diameter of Tsukuda et al. is 4  $\mu\text{m}$  (as applying Bahar et al.'s definition of what bubble point diameter corresponds to), then the mean pore diameter should be less than that in a manner wherein porosity is still expected (i.e. greater than 0.3  $\mu\text{m}$ ).

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However, it is noted that an alternate obviousness rejection is made if it shown that Tsukuda et al.'s separator is shown not to inherently have the characteristics of a 0.3-5  $\mu\text{m}$  and a bubble point pore diameter of 3-20  $\mu\text{m}$  in accordance with ASTM F 316 86.

Alternately, both bubble point diameter and mean flow pore diameter are seen to be result effective variables, and accordingly, one of ordinary skill in the art would have found it obvious to optimize both values. The bubble point diameter (corresponding to the maximum pore diameter, as evidenced by Bahar et al.) is a result effective variable, wherein its size effects whether or not dendrites can penetrate the separator easily. The mean flow pore diameter (corresponding to mean pore size) is also a result effective variable, wherein not only does it affect dendrite growth/penetration, but it also affects how much electrolyte can be held within the separator (which in turn affects the electrochemical potential of the cell). Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a separator with a mean flow pore diameter of 0.3-5  $\mu\text{m}$  and a bubble point pore diameter of 3-20  $\mu\text{m}$  in accordance with ASTM F 316 86, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). It has been held that discovering that general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art *unless* there is evidence indicating such ranges is critical.

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*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

NOTE: With respect to (d), above, an alternate 103 rejection has been made using a secondary reference. Please see \* below.

As to claim 34, Tsukuda et al. teach that the polyvinyl alcohol binder (gelling resin) is fibrous and forms on the surface of the porous base wherein the fibers (and thus their surfaces) are heat-meltable (col. 13, lines 22-29 and 54-61).

As to claim 35, Tsukuda et al. teach that the polyvinyl alcohol (gelling resin) is 50% or less (preferably 30% or less) in the porous base (col. 13, lines 35-38).

As to claims 36, Tsukuda et al. teach of using a polyvinyl alcohol binder (gelling resin), wherein ethylene-vinyl alcohol copolymer is specifically embodied (col. 13, lines 22-29 and 62-67).

As to claims 37-38, Tsukuda et al. teach that the other fibers (organic fibers, such as polyolefins, which encompasses polypropylene and polyethylene) are fibrillated to a diameter of 1  $\mu\text{m}$  or less (col. 11, lines 47-53).

As to claims 39, Tsukuda et al. teach that the polyvinyl alcohol binder (gelling resin), wherein ethylene-vinyl alcohol copolymer is specifically embodied (col. 13, lines 22-29 and 62-67). (Note: Ethylene is an olefin fiber.)

As to claim 40, Tsukuda et al. teach that the organic fibers (other fiber) is in a weight percent of 5-100%, while the weight percent of the polyvinyl alcohol (gelling resin) is 50% weight or less (more preferably 30% weight or less). Accordingly, in a 100

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part by weight sample, embodied amounts of gelling resin would be 30 parts and 50 parts, wherein 70 parts and 50 parts of the other fiber would follow (as necessary for mass balance). These two data points read on the claimed ratio, as shown by the calculations below.

$$\begin{aligned}
 &100\_wt\_part\_example \\
 &\frac{50\_parts\_other\_fiber}{50\_parts\_resin} = \frac{100\_parts\_other\_fiber}{100\_parts\_resin} \\
 &\frac{70\_parts\_other\_fiber}{30\_parts\_resin} = \frac{233\_parts\_other\_fiber}{100\_parts\_resin}
 \end{aligned}$$

It is noted that although the strength of the other fiber is not specifically mentioned, this characteristic is inherent. The basis for inherency is that the strength of a fiber is dependent on the material of the fiber. Therefore, since Tsukuda et al. embodies the same fiber (such as polypropylene and polyethylene, which is mentioned for its strength) (col. 9, lines 33-40) as that of the instant application (see p 35 of the Specification, lines 1-7). Since the materials are the same, the same strength characteristic would be inherent. (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

As to claim 41, Tsukuda et al. teach that the organic fibers (other fiber) is in a weight percent of 5-100%, while the weight percent of the polyvinyl alcohol (gelling resin) is 50% weight or less (more preferably 30% weight or less). Accordingly, in a 100 part by weight sample, embodied amounts of gelling resin would be 30 parts and 50 parts, wherein 70 parts and 50 parts of the other fiber would follow (as necessary for mass balance). These two data points read on the claimed ratio, as shown by the calculations below.

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*100 \_wt \_part \_example*

$$\frac{50\_parts\_other\_fiber}{50\_parts\_resin} = \frac{100\_parts\_other\_fiber}{100\_parts\_resin}$$

$$\frac{70\_parts\_other\_fiber}{30\_parts\_resin} = \frac{233\_parts\_other\_fiber}{100\_parts\_resin}$$

It is noted although the fact that the other fiber is a heat-melting fiber that does not substantially shrink is not specifically mentioned, these characteristics are inherent. The basis for inherency is that the strength of a fiber is dependent on the material of the fiber. As mentioned before Tsukuda et al.'s organic fibers (other fibers) are polyolefins (with polypropylene and polyethylene particularly embodied) (col. 11, lines 48-53). The instant application teaches that a polyolefin is used as the heat-melting fiber (p16, lines 36-37; p17, line 1). Accordingly, since the materials are the same, the other fiber, which also serves as including a heat-melting fiber is seen to not substantially shrink at a temperature that causes the heat-and-humidity gelling resin to gel under heat and humidity to fix the other fiber, as the material embodied by Tsukuda et al. and the instant application are the same. (It is noted, that the gelling resin is the same, too, as both Tsukuda et al. and the instant application embody a ethylene-vinyl alcohol copolymer, see col. 13, lines 62-67 and p9, lines 25-28, respectively.) (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

As to claim 42, Tsukuda et al. teach of an example with micro-glass, polyimide fibers (synthetic pulp), polyethylene/polypropylene composite (other fiber), as well as a polyvinyl alcohol (gelling resin) (example 97, col. 42, lines 10-30). (The polyimide fibers are taken to be synthetic, as they are man made, see example 74, lines 59-66).

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As to claim 43, Tsukuda et al.'s example 97 teaches the following ratio: micro-glass:polyimide:composite:polyvinyl alcohol is 40:15:35:10. Accordingly, with respect to a 100 weight sample, the example falls within the claimed range, as shown by the calculation below.

$$\frac{100 \text{ wt part example}}{15 \text{ parts polyimide}} = \frac{150 \text{ parts polyimide}}{10 \text{ parts resin}}$$

As to claim 49, Tsukuda et al. teach that the organic fibers (other fibers) are cut to a fiber length of 5 mm or less, preferably 3 mm or less (col. 12, lines 45-48). It is noted that the specific manner in which the nonwoven sheet is formed, it is said that a wet sheet is obtained (col. 6, lines 66-67; col. 7, lines 1-5), thus indicating wetlaying of some sort. It is additionally noted that wetlaying is a product by process limitation, wherein the product of Tsukuda et al. is the same as that of the instant application.

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)(citations omitted).

"The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742,



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744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

As to claim 50, as previously stated, Tsukuda et al. teach that a wet sheet is obtained [from the organic fibers] (col. 6, lines 66-67; col. 7, lines 1-5), thus indicating wetlaying of some sort. It is noted that the separator using a polyvinyl alcohol (gelling resin) is uniform (col. 60, lines 34-36). Accordingly, the product is taken substantially uniform with respect to the gelling resin in the separator, barring specification as to what constitutes "substantially uniformly present." It is noted that the use of a splittable composite fiber and splitting it during wetlaying to provide the gelling fiber is a product by process limitation, wherein the product of Tsukuda et al. is the same as that of the instant application (as the both an other fiber as well as gelling resin exist in the final product).

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is

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unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)(citations omitted).

“The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature” than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

Note: For an alternate 103 rejection using a secondary piece for the splittable composite fiber, see \*\*\* below.

As to claim 51, Tsukuda et al. teach that the polyvinyl alcohol binder (gelling resin) forms as a film on the surface of the porous base (col. 13, lines 22-29).

As to claim 53, Tsukuda et al., although no test is completed wherein an angle of dechlorinated water dropped on the surface is taken after 5 seconds of dropping the water, if done the product of Tsukuda et al. would inherently yield the characteristic of displaying an angle of 60 degrees or less. The basis for inherency is that the product of Tsukuda et al. is the same as that claimed by the instant application. Therefore this characteristic would be expected if the product of Tsukuda et al. were subjected to the

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same conditions. (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

As to claims 54 and 55, Tsukuda et al.'s separator inherently has a puncture strength of 2 N or more and a standard deviation of 1.1 N or less (as required by claim 54) and a variation index of puncture strength of 0.165 or less. The basis for inherency is that the product of Tsukuda et al. is the same as that claimed by the instant application. Therefore these characteristic would be expected if the product of Tsukuda et al. were subjected to the same conditions. (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

As to claim 56, Tsukuda et al.'s separator has a thickness of preferably between 20-60  $\mu\text{m}$  (col. 20, lines 43-47). Although the specific volume is not specifically stated (1.2 to 2.5  $\text{cm}^3/\text{g}$ ), such a characteristic is inherent. The basis of inherency is that the structure of Tsukuda et al. is the same as that taught by the instant application. (As set forth in the rejection to claim 33, similar materials and pore sizes are embodied. As set forth in the rejection to claim 35, the ratio of materials used are similar. Additionally, the size of the other fibers used are similar, too, as set forth in the rejection to claims 37.) Accordingly, since the materials used, pore size of the resulting separator, the ratio of the materials used, as well as the physical attributes of the materials are all similar, it is expected that the final product would have the same specific volume, barring proof to the contrary. (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

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If it is shown that such a characteristic is not inherent, it would be alternately obvious. As previously stated, the product of the instant application and that of Tsukuda et al. are similar (similar materials use, similar sizes, similar ratios). Accordingly, any differences in the two products are seen to be small. It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985). Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). Claims that differ from the prior art only by slightly different (non-overlapping) ranges are prima facie obvious without a showing that the claimed range achieves unexpected results relative to the prior art. (In re Woodruff, 16 USPQ2d 1935,1937 (Fed. Cir. 1990)).

Additionally, it is noted that specific volume is a result effective variable, wherein it can be optimized with respect porosity (i.e. smaller porosity would yield a separator with better mechanical features, however larger porosity would yield a separator that has a larger capacity to hold electrolyte). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make a separator with a specific volume of 1.2 to 2.5 cm<sup>3</sup>/g, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617

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F.2d 272, 205 USPQ 215 (CCPA 1980). It has been held that discovering that general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art *unless* there is evidence indicating such ranges is critical. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

As to claim 63, Tsukuda et al.'s separator is used in a lithium battery, which has an organic electrolyte, as the battery fabricated with the examples and comparative examples are made of LiClO<sub>4</sub>, ethylene carbonate, and diethylene carbonate (col. 51, lines 11-23).

### ***Claim Rejections - 35 USC § 103***

13. Claims 33-43, 49-51, 53-56, and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukuda et al. in view of US 2003/0113619 (Zucker), as evidenced by Bahar et al.

\*As to claim 33, Tsukuda et al. teach of a porous separator for a lithium battery, wherein a nonwoven fabric is embodied as the type of porous base (abs). The separator taught by Tsukuda et al. is for use in a lithium battery, which has an organic electrolyte, as the battery fabricated with the examples and comparative examples are made of LiClO<sub>4</sub>, ethylene carbonate, and diethylene carbonate (col. 51, lines 11-23). The porous base, wherein nonwoven fabric is embodied contains organic fibers (other fiber) such as polypropylene and polyethylene acrylic fibers (col. 9, lines 33-57).

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Tsukuda et al. also embodies the use of a binder (gelling resin) when fibrillated polymeric organic fibers (polyethylene and polypropylene fit into this description) are used, wherein a polyvinyl alcohol, such as ethylene-vinyl alcohol copolymer is embodied (col. 13, lines 8-29 and 62-67).

It is noted that the gelling resin (binder of Tsukuda et al.) (a) is capable of gelling by heating in the presence of moisture and another fiber and (b) does gel under these conditions.

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

“In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.” Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

In the case of the instant application the basis for expectation of inherency is: With respect to (a) that the same gelling resin and other fiber as defined in Tsukuda et al. above are embodied by the instant application (see p 9, lines 17-28; p 11, lines 1-15). (Note: It is interpreted that with the teaching of Tsukuda et al. that since ethylene-

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vinyl alcohol copolymer is a specific species in the generic polyvinyl alcohol species that all polyvinyl alcohols would act in the same manner under the same conditions, barring proof to the contrary.)

With respect to (b) same conditions of heat (by pressing) and humidity (water), as claimed, exist in Tsukuda et al., as water is included in the binder and that hot pressing occurs afterwards (see col. 13, lines 53-67; col. 17, lines 50-65).

The Examiner requires applicant to provide that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product.

Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

It is noted that the porous film has a maximum pore diameter of 10  $\mu\text{m}$ , as detected using ASTM F-316-80 bubble point method and nonwoven fabric base has a maximum pore diameter of 20  $\mu\text{m}$  (col. 5, lines 50-65).

It is noted that such a teaching inherently embodies a bubble point pore diameter of 3-20  $\mu\text{m}$  in accordance with ASTM F 316 86. Although the use of an ASTM F 316 86 standard is not specifically the characteristic is still inherent.

The basis for inherency is that the tests of ASTM F 316 86 and that of the used ASTM F-316-80 measure the same thing and would thus report bubble point values that

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are similar. Therefore, the bubble point diameters of Tsukuda et al. (with one specific data point at 4  $\mu\text{m}$ , as in examples 120-124) should be close to, if not identical to that of the claim.

However, it is noted that an alternate obviousness rejection is made if it shown that Tsukuda et al.'s separator is shown not to inherently have the characteristics of a 0.3-5  $\mu\text{m}$  and a bubble point pore diameter of 3-20  $\mu\text{m}$  in accordance with ASTM F 316 86.

Alternately, bubble point diameter is seen to be a result effective variable, and accordingly, one of ordinary skill in the art would have found it obvious to optimize it. The bubble point diameter (corresponding to the maximum pore diameter, as evidenced by Bahar et al. (col. 9, lines 55-67; col. 10, lines 1-3)) is a result effective variable, wherein its size effects whether or not dendrites can penetrate the separator easily. Accordingly, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a separator with a bubble point pore diameter of 3-20  $\mu\text{m}$  in accordance with ASTM F 316 86, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). It has been held that discovering that general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art *unless* there is evidence indicating such ranges is critical. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). *In re Aller*, 220 F.2d 454,



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456, 105 USPQ 233, 235 (CCPA 1955). *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

It can be interpreted that Tsukuda et al. does not specifically state that the mean flow pore diameter is between 0.3- 5  $\mu\text{m}$ .

Zucker teaches of a melt blow battery separator, which can be used in a lithium battery (title; para 008). It is taught that the average desired pore size is in the range of 0.3-50 microns or more narrowly 1-25 microns (para 0010). (It is noted that the separator of Zucker is similar to that of Tsukuda et al., polyolefins, such as polyethylene and polypropylene (para 0011).) (It is reminded that Bahar et al., relied upon as an evidentiary piece, links mean flow pore diameter to the mean pore size (col. 9, lines 55-67; col. 10, lines 1-3), wherein such an interpretation is relied upon). The motivation for making a battery with the characteristics as disclosed by Zucker (i.e. the claimed pore size) is in order to create a melt blown nonwoven separator having sufficient mechanical properties and sufficiently small pores for the use as a separator in a battery (para 0006). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use the average pore size in the range disclosed Zucker et al. (wherein 0.3 and 1 microns, both of which fit in the range of the claimed instant application) in order to create a separator with sufficient mechanical properties and sufficiently small pores in order to operate well as a battery separator.

As to claim 34, Tsukuda et al. teach that the polyvinyl alcohol binder (gelling resin) is fibrous and forms on the surface of the porous base wherein the fibers (and thus their surfaces) are heat-meltable (col. 13, lines 22-29 and 54-61).

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As to claim 35, Tsukuda et al. teach that the polyvinyl alcohol (gelling resin) is 50% or less (preferably 30% or less) in the porous base (col. 13, lines 35-38).

As to claims 36, Tsukuda et al. teach of using a polyvinyl alcohol binder (gelling resin), wherein ethylene-vinyl alcohol copolymer is specifically embodied (col. 13, lines 22-29 and 62-67).

As to claims 37-38, Tsukuda et al. teach that the other fibers (organic fibers, such as polyolefins, which encompasses polypropylene and polyethylene) are fibrillated to a diameter of 1  $\mu\text{m}$  or less (col. 11, lines 47-53).

As to claims 39, Tsukuda et al. teach that the polyvinyl alcohol binder (gelling resin), wherein ethylene-vinyl alcohol copolymer is specifically embodied (col. 13, lines 22-29 and 62-67). (Note: Ethylene is an olefin fiber.)

As to claim 40, Tsukuda et al. teach that the organic fibers (other fiber) is in a weight percent of 5-100%, while the weight percent of the polyvinyl alcohol (gelling resin) is 50% weight or less (more preferably 30% weight or less). Accordingly, in a 100 part by weight sample, embodied amounts of gelling resin would be 30 parts and 50 parts, wherein 70 parts and 50 parts of the other fiber would follow (as necessary for mass balance). These two data points read on the claimed ratio, as shown by the calculations below.

*100 \_ wt \_ part \_ example*

$$\frac{50\_parts\_other\_fiber}{50\_parts\_resin} = \frac{100\_parts\_other\_fiber}{100\_parts\_resin}$$

$$\frac{70\_parts\_other\_fiber}{30\_parts\_resin} = \frac{233\_parts\_other\_fiber}{100\_parts\_resin}$$

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It is noted that although the strength of the other fiber is not specifically mentioned, this characteristic is inherent. The basis for inherency is that the strength of a fiber is dependent on the material of the fiber. Therefore, since Tsukuda et al. embodies the same fiber (such as polypropylene and polyethylene, which is mentioned for its strength) (col. 9, lines 33-40) as that of the instant application (see p 35 of the Specification, lines 1-7). Since the materials are the same, the same strength characteristic would be inherent. (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

As to claim 41, Tsukuda et al. teach that the organic fibers (other fiber) is in a weight percent of 5-100%, while the weight percent of the polyvinyl alcohol (gelling resin) is 50% weight or less (more preferably 30% weight or less). Accordingly, in a 100 part by weight sample, embodied amounts of gelling resin would be 30 parts and 50 parts, wherein 70 parts and 50 parts of the other fiber would follow (as necessary for mass balance). These two data points read on the claimed ratio, as shown by the calculations below.

$$\begin{aligned}
 &100\_wt\_part\_example \\
 &\frac{50\_parts\_other\_fiber}{50\_parts\_resin} = \frac{100\_parts\_other\_fiber}{100\_parts\_resin} \\
 &\frac{70\_parts\_other\_fiber}{30\_parts\_resin} = \frac{233\_parts\_other\_fiber}{100\_parts\_resin}
 \end{aligned}$$

It is noted although the fact that the other fiber is a heat-melting fiber that does not substantially shrink is not specifically mentioned, these characteristics are inherent. The basis for inherency is that the strength of a fiber is dependent on the material of the fiber. As mentioned before Tsukuda et al.'s organic fibers (other fibers) are polyolefins

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(with polypropylene and polyethylene particularly embodied) (col. 11, lines 48-53). The instant application teaches that a polyolefin is used as the heat-melting fiber (p16, lines 36-37; p17, line 1). Accordingly, since the materials are the same, the other fiber, which also serves as including a heat-melting fiber is seen to not substantially shrink at a temperature that causes the heat-and-humidity gelling resin to gel under heat and humidity to fix the other fiber, as the material embodied by Tsukuda et al. and the instant application are the same. (It is noted, that the gelling resin is the same, too, as both Tsukuda et al. and the instant application embody a ethylene-vinyl alcohol copolymer, see col. 13, lines 62-67 and p9, lines 25-28, respectively.) (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

As to claim 42, Tsukuda et al. teach of an example with micro-glass, polyimide fibers (synthetic pulp), polyethylene/polypropylene composite (other fiber), as well as a polyvinyl alcohol (gelling resin) (example 97, col. 42, lines 10-30). (The polyimide fibers are taken to be synthetic, as they are man made, see example 74, lines 59-66).

As to claim 43, Tsukuda et al.'s example 97 teaches the following ratio – micro-glass:polyimide:composite:polyvinyl alcohol is 40:15:35:10. Accordingly, with respect to a 100 weight sample, the example falls within the claimed range, as shown by the calculation below.

$$\frac{100 \text{ _wt _part _example}}{10 \text{ _parts _resin}} = \frac{150 \text{ _parts _polyimide}}{100 \text{ _parts _resin}}$$

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As to claim 49, Tsukuda et al. teach that the organic fibers (other fibers) are cut to a fiber length of 5 mm or less, preferably 3 mm or less (col. 12, lines 45-48). It is noted that the specific manner in which the nonwoven sheet is formed, it is said that a wet sheet is obtained (col. 6, lines 66-67; col. 7, lines 1-5), thus indicating wetlaying of some sort. It is additionally noted that wetlaying is a product by process limitation, wherein the product of Tsukuda et al. is the same as that of the instant application.

“[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)(citations omitted).

“The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature” than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

As to claim 50, as previously stated, Tsukuda et al. teach that a wet sheet is obtained [from the organic fibers] (col. 6, lines 66-67; col. 7, lines 1-5), thus indicating wetlaying of some sort. It is noted that the separator using a polyvinyl alcohol (gelling resin) is uniform (col. 60, lines 34-36). Accordingly, the product is taken substantially uniform with respect to the gelling resin in the separator, barring specification as to what constitutes "substantially uniformly present." It is noted that the use of a splittable composite fiber and splitting it during wetlaying to provide the gelling fiber is a product by process limitation, wherein the product of Tsukuda et al. is the same as that of the instant application (as the both an other fiber as well as gelling resin exist in the final product).

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)(citations omitted).

"The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to

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come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

Note: For an alternate 103 rejection using a secondary piece for the splittable composite fiber, see \*\*\* below.

As to claim 51, Tsukuda et al. teach that the polyvinyl alcohol binder (gelling resin) forms as a film on the surface of the porous base (col. 13, lines 22-29).

As to claim 53, Tsukuda et al., although no test is completed wherein an angle of dechlorinated water dropped on the surface is taken after 5 seconds of dropping the water, if done the product of Tsukuda et al. would inherently yield the characteristic of displaying an angle of 60 degrees or less. The basis for inherency is that the product of Tsukuda et al. is the same as that claimed by the instant application. Therefore this characteristic would be expected if the product of Tsukuda et al. were subjected to the same conditions. (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

As to claims 54 and 55, Tsukuda et al.'s separator inherently has a puncture strength of 2 N or more and a standard deviation of 1.1 N or less (as required by claim 54) and a variation index of puncture strength of 0.165 or less. The basis for inherency is that the product of Tsukuda et al. is the same as that claimed by the instant application. Therefore these characteristic would be expected if the product of Tsukuda

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et al. were subjected to the same conditions. (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

As to claim 56, Tsukuda et al.'s separator has a thickness of preferably between 20-60  $\mu\text{m}$  (col. 20, lines 43-47). Although the specific volume is not specifically stated (1.2 to 2.5  $\text{cm}^3/\text{g}$ ), such a characteristic is inherent or else obvious.

The basis of inherency is that the structure of Tsukuda et al. is the same as that taught by the instant application. (As set forth in the rejection to claim 33, similar materials and pore sizes are embodied. As set forth in the rejection to claim 35, the ratio of materials used is similar. Additionally, the size of the other fibers used is similar, too, as set forth in the rejection to claims 37.) Accordingly, since the materials used, pore size of the resulting separator, the ratio of the materials used, as well as the physical attributes of the materials are all similar, it is expected that the final product would have the same specific volume, barring proof to the contrary. (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

If it is shown that such a characteristic is not inherent, it would be alternately obvious. As previously stated, the product of the instant application and that of Tsukuda et al. are similar (similar materials use, similar sizes, similar ratios). Accordingly, any differences in the two products are seen to be small. It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985). Generally, differences in ranges



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will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). Claims that differ from the prior art only by slightly different (non-overlapping) ranges are prima facie obvious without a showing that the claimed range achieves unexpected results relative to the prior art. (In re Woodruff, 16 USPQ2d 1935,1937 (Fed. Cir. 1990)).

Additionally, it is noted that specific volume is a result effective variable, wherein it can be optimized with respect porosity (i.e. smaller porosity would yield a separator with better mechanical features, however larger porosity would yield a separator that has a larger capacity to hold electrolyte). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make a separator with a specific volume of 1.2 to 2.5 cm<sup>3</sup>/g, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). It has been held that discovering that general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art *unless* there is evidence indicating such ranges is critical. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

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As to claim 63, Tsukuda et al.'s separator is used in a lithium battery, which has an organic electrolyte, as the battery fabricated with the examples and comparative examples are made of  $\text{LiClO}_4$ , ethylene carbonate, and diethylene carbonate (col. 51, lines 11-23).

14. Claims 44-46 and 52 are rejected under either 35 U.S.C. 103(a) as being unpatentable over either (a) Tsukuda et al. as evidenced by Bahar et al. or (b) Tsukuda et al. in view of Zucker, as evidenced by Bahar et al., as applied to claims 33, 34, and 51.

As to claim 44, it is noted that although Tsukuda et al. does not exemplify the fiber diameter of the gelling fiber (of the gelling resin) that the other fibers (organic fibers, such as polyolefins, which encompasses polypropylene and polyethylene) are fibrillated to a diameter of 1  $\mu\text{m}$  or less (col. 11, lines 47-53). Additionally, it is noted that one embodied thickness of the separator is 10  $\mu\text{m}$  (col. 20, lines 43-52). Accordingly, one of ordinary skill in the art would expect the fiber diameter of the gelling fiber (polyvinyl alcohol binder) to be no more than 10  $\mu\text{m}$ , since it would be impossible to embody a separator that is 10  $\mu\text{m}$  thick, wherein the binder is greater than 10  $\mu\text{m}$ . Accordingly, the average fiber diameter of the gelling fiber (10  $\mu\text{m}$  or less) and other fiber (1  $\mu\text{m}$ ) would be expected to be 10  $\mu\text{m}$  or less. Additionally, it is noted that the size of the gelling fiber is also a result effective variable, wherein it can be optimized with respect to producing a homogenous mixture with that of the other materials of the separator as well as with respect to desired thickness of the separator. It would have been obvious to one having ordinary skill in the art at the time the invention was made

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to have an average fiber diameter of the gelling fiber and the other fiber of 10  $\mu\text{m}$  or less, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). It has been held that discovering that general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art *unless* there is evidence indicating such ranges is critical. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

As to claim 45, it is noted that although Tsukuda et al. does not exemplify the fiber diameter of the gelling fiber (of the gelling resin) that one embodied thickness of the separator is 10  $\mu\text{m}$  (col. 20, lines 43-52). Accordingly, one of ordinary skill in the art would expect the fiber diameter of the gelling fiber (polyvinyl alcohol binder) to be no more than 10  $\mu\text{m}$ , since it would be impossible to embody a separator that is 10  $\mu\text{m}$  thick, wherein the binder is greater than 10  $\mu\text{m}$ . Therefore, one of ordinary skill in the art, from the teaching of Tsukuda et al., would expect the binder to be 10  $\mu\text{m}$  or less (which is seen at the very last close to the 6  $\mu\text{m}$  embodied by the claimed invention). It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985). Generally,

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differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). Claims that differ from the prior art only by slightly different (non-overlapping) ranges are prima facie obvious without a showing that the claimed range achieves unexpected results relative to the prior art. (*In re Woodruff*, 16 USPQ2d 1935,1937 (Fed. Cir. 1990)).

Additionally, it is noted that the size of the gelling fiber is also a result effective variable, wherein it can be optimized with respect to producing a homogenous mixture with that of the other materials of the separator as well as with respect to desired thickness of the separator. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a gelling fiber having a diameter of 1-6  $\mu\text{m}$ , since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). It has been held that discovering that general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art *unless* there is evidence indicating such ranges is critical. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

As to claim 46, Tsukuda et al. teach the battery as disclosed above. It is notable that split fabric is embodied for bonding the nonwoven fabric (col. 17, lines 34-41). It is not stated that the gelling fiber is provided by splitting a splittable composite fiber that contains the heat-and-humidity gelling resin and another resin, which are adjacent to each other in a cross-section of the fiber. However, this is seen as a product-by-process limitation, wherein Tsukuda et al. embody the use of a splittable fabric as well as the gelling resin. Accordingly, the product of Tsukuda et al. is seen to be the same as that of the instant application.

“[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)(citations omitted).

“The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature” than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292

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(Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

Note: For an alternate 103 rejection using a secondary piece for the splittable composite fiber, see \*\* below.

As to claim 52, Tsukuda et al. does not specifically teach an area of which the film gel covers the surface of the nonwoven (40-90%). However, Tsukuda et al. does mention that such a characteristic is a result effective variable. Tsukuda et al. specifically teach that the polyvinyl alcohol is applied to the base by impregnation, coating, or spraying (col. 13, lines 22-29). All of the three aforementioned methods are applied to the surface of separator (which is why the gel film is formed on the surface). Tsukuda et al. also teach of a preferred weight of the porous base that the polyvinyl alcohol takes up (50% or less, more preferably 30% or less). It is further noted that if the polyvinyl alcohol binder is more than 50% of the porous base, the area of the film formed on the surface of the base becomes too large and the pores necessary for ion permeation are apt to be unevenly distributed, and, in some cases the porous base becomes filmy and the pores are ruptured (col. 13, lines 38-44). However, it is also noted that the polyvinyl alcohol acts as a binder and makes pores small for the separator, which imparts excellent mechanical strength including tensile strength, tear strength, and penetration strength (col. 13, lines 44-54). Accordingly, the amount of polyvinyl alcohol binder on the surface of the separator is a result effective variable between imparting proper mechanical strength without disrupting pores necessary for ion permeation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to optimize the amount of polyvinyl alcohol used, which thus optimizes the amount of film gel on the surface of the nonwoven base, since it has been held that discovering an optimum value of a result effective variable involves only

routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). It has been held that discovering that general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art *unless* there is evidence indicating such ranges is critical. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

15. Claims 46-48 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over either (a) Tsukuda et al. as evidenced by Bahar et al. or (b) Tsukuda et al. in view of Zucker, as evidenced by Bahar et al., as applied to claims 33, 34, 45, and 49, in further view of US 2002/0037408 (Tsutsui et al.).

\*\*As to claim 46, Tsukuda et al. teach a product similar to that of the instant application (with respect to materials used, size of materials, and ratio of materials). However, Tsukuda et al. does not mention that a splittable composite fiber is used to provide the gelling fiber. If it is shown that the use of a splittable fiber to provide the gelling fiber changes the structure of the final product, Tsutsui et al. is further relied upon to show why the use of such would have been obvious.

Tsutsui et al. teach the use of a splittable fiber using polyolefins (polyethylene and polypropylene are the two embodied components), wherein ethylene-vinyl alcohol copolymer (gelling resin) is added to at least one of the components in a battery separator (para 0001 and 0009-0010). This accordingly would create a splittable fiber with a gelling resin and another resin adjacent to each other (wherein the gelling resin is

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only added to one of the components, as seen in fig. 1). The motivation for using the splittable fiber taught by Tsutsui et al. in the battery of Tsukuda et al. is that such a fiber is easier to split, and a fine fiber is easily formed by splitting, thus making it producible using less pressure and solving problems like deterioration of uniformity of the fiber structure and opening of the penetrated part, thus resulting in good surface qualities and uniformity (para 0061-0062). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use the splittable fiber of Tsutsui et al. in order to have a sheet that is easier to make (as less pressure is required to be applied) and in order to solve problems such as deterioration of uniformity of the fiber structure and opening of the penetrated part, resulting in good surface qualities and uniformity. Furthermore, since Tsutsui et al. teach of using a splittable fiber in a battery separator (wherein the materials used to make up such a fiber (polypropylene, polyethylene, and a polyvinyl alcohol) are used in Tsukuda et al.), it would have been obvious to one having ordinary skill in the art at the time the invention was made to use such a splittable fiber, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

As to claim 47, it is noted that Tsutsui et al. is relied upon to teach the use of a splittable composite fiber comprising a gelling resin and another resin adjacent to one another in a cross-section of the fiber(as within the rejection of claim 46). This splittable fiber provides the gelling fiber.



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The combination does not specifically mention (a) the strength of the other fiber (4.5 cN/dtex), (b) that the other fiber is in a range of 10-200 parts per mass per 100 parts of the composite fiber, (c) a heat-melting fiber that does not substantially shrink at a temperature that causes the heat-and-humidity gelling resin to gel under heat and humidity, wherein (d) the heat-melting fiber is in a range of 10-200 parts per mass per 100 parts of the composite fiber.

With respect to (a), the strength of the other fiber is inherent. The basis for inherency is that the strength of a fiber is dependent on the material of the fiber. Therefore, since Tsukuda et al. embodies the same fiber (such as polypropylene and polyethylene, which is mentioned for its strength) (col. 9, lines 33-40) as that of the instant application (see p 35 of the Specification, lines 1-7). Since the materials are the same, the same strength characteristic would be inherent. (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

With respect to (c), although the fact that the other fiber is a heat-melting fiber that does not substantially shrink is not specifically mentioned, these characteristics are inherent. The basis for inherency is that the strength of a fiber is dependent on the material of the fiber. As mentioned before Tsukuda et al.'s organic fibers (other fibers) are polyolefins (with polypropylene and polyethylene particularly embodied) (col. 11, lines 48-53). The instant application teaches that a polyolefin is used as the heat-melting fiber (p16, lines 36-37; p17, line 1). Accordingly, since the materials are the same, the other fiber, which also serves as including a heat-melting fiber is seen to not substantially shrink at a temperature that causes the heat-and-humidity gelling resin to

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gel under heat and humidity to fix the other fiber, as the material embodied by Tsukuda et al. and the instant application are the same. (It is noted, that the gelling resin is the same, too, as both Tsukuda et al. and the instant application embody a ethylene-vinyl alcohol copolymer, see col. 13, lines 62-67 and p9, lines 25-28, respectively.) (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

With respect to (b) and (d), (taking the other fiber and heat-melting fiber to be the same fiber), the composition of the other fiber/heat-melting fiber with respect to a composite fiber is not clear with respect to the combination. However it is noted that the amount of gelling resin (polyvinyl alcohol binder) to use in a separator is a result effective variable, and accordingly adding the correct optimized amount would also optimize the other fiber/heat-melting fiber. It is stated in Tsukuda et al. that using too much binder causes a film to be formed on the surface of the base to become too large, which disturbs the pores necessary for ion permeation are apt to be unevenly distributed, and, in some cases the porous base becomes filmy and the pores are ruptured (Tsukuda et al. col. 13, lines 38-44). However, it is also noted that the polyvinyl alcohol acts as a binder and makes pores small for the separator, which imparts excellent mechanical strength including tensile strength, tear strength, and penetration strength (Tsukuda et al. col. 13, lines 44-54). Accordingly, the amount of polyvinyl alcohol binder to use in a separator is a result effective variable between imparting proper mechanical strength without disrupting pores necessary for ion permeation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to optimize the amount of polyvinyl alcohol used (which

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would in turn provide the optimized balance of other/heat-melting fibers), since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). It has been held that discovering that general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art *unless* there is evidence indicating such ranges is critical. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

As to claim 48, it is noted that Tsutsui et al. is relied upon to teach the use of a splittable composite fiber comprising a gelling resin and another resin adjacent to one another in a cross-section of the fiber(as within the rejection of claim 46). This splittable fiber provides the gelling fiber.

The combination does not specifically mention (a) the strength of the other fiber (4.5 cN/dtex), (b) that the other fiber is in a range of 6.25-120 parts per mass per 100 parts of the composite fiber, (c) a heat-melting fiber that does not substantially shrink at a temperature that causes the heat-and-humidity gelling resin to gel under heat and humidity, wherein (d) the heat-melting fiber is in a range of 12.5 to 120 parts per mass per 100 parts of the composite fiber, and that (e) there is further a synthetic pulp in a range of 6.25 to 120 parts by mass.

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With respect to (a), the strength of the other fiber is inherent. The basis for inherency is that the strength of a fiber is dependent on the material of the fiber. Therefore, since Tsukuda et al. embodies the same fiber (such as polypropylene and polyethylene, which is mentioned for its strength) (col. 9, lines 33-40) as that of the instant application (see p 35 of the Specification, lines 1-7). Since the materials are the same, the same strength characteristic would be inherent. (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

With respect to (c), although the fact that the other fiber is a heat-melting fiber that does not substantially shrink is not specifically mentioned, these characteristics are inherent. The basis for inherency is that the strength of a fiber is dependent on the material of the fiber. As mentioned before Tsukuda et al.'s organic fibers (other fibers) are polyolefins (with polypropylene and polyethylene particularly embodied) (col. 11, lines 48-53). The instant application teaches that a polyolefin is used as the heat-melting fiber (p16, lines 36-37; p17, line 1). Accordingly, since the materials are the same, the other fiber, which also serves as including a heat-melting fiber is seen to not substantially shrink at a temperature that causes the heat-and-humidity gelling resin to gel under heat and humidity to fix the other fiber, as the material embodied by Tsukuda et al. and the instant application are the same. (It is noted, that the gelling resin is the same, too, as both Tsukuda et al. and the instant application embody a ethylene-vinyl alcohol copolymer, see col. 13, lines 62-67 and p9, lines 25-28, respectively.) (Please see the rejection of claim 33 for the Office's policy on inherent characteristics.)

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With respect to (b), (d), and (e), it is noted that with the interpretation above, the other fiber and heat-melting fiber are the same fiber. It is also noted that Tsukuda et al. teach of an example with micro-glass, polyimide fibers (synthetic pulp), polyethylene/polypropylene composite (other fiber), as well as a polyvinyl alcohol (gelling resin) (example 97, col. 42, lines 10-30). (The polyimide fibers are taken to be synthetic, as they are man made, see example 74, lines 59-66). However, the composition of the other fiber/heat-melting fiber and synthetic fiber with respect to a composite fiber is not clear with respect to the combination.

However it is noted that the amount of gelling resin (polyvinyl alcohol binder) to use in a separator, as well as the amount of the other materials used in the porous base, is a result effective variable, and accordingly adding the optimized ratios of each would provide an optimized product. With respect to the binder (gelling resin), it is stated in Tsukuda et al. that using too much binder causes a film to be formed on the surface of the base to become too large, which disturbs the pores necessary for ion permeation are apt to be unevenly distributed, and, in some cases the porous base becomes filmy and the pores are ruptured (Tsukuda et al. col. 13, lines 38-44). However, it is also noted that the polyvinyl alcohol acts as a binder and makes pores small for the separator, which imparts excellent mechanical strength including tensile strength, tear strength, and penetration strength (Tsukuda et al. col. 13, lines 44-54). Accordingly, the amount of polyvinyl alcohol binder to use in a separator is a result effective variable between imparting proper mechanical strength without disrupting pores necessary for ion permeation. It would have been obvious to one having ordinary

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skill in the art at the time the invention was made to optimize the amount of polyvinyl alcohol used (which would in turn provide the optimized balance of other/heat-melting fibers), since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). It has been held that discovering that general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art *unless* there is evidence indicating such ranges is critical. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). (It is noted that once the ratio of the polyvinyl alcohol binder has been optimized, both the other/heat-melting fiber and the synthetic pulp ratios follow, as per Tsukuda et al.'s example 97. The ratio is as follows micro-glass:polyimide:composite:polyvinyl alcohol is 40:15:35:10. The amount of polyimide (synthetic pulp) is about 43% of the other/heat-melting fiber. Accordingly, if proper usage of polyvinyl alcohol binder to other/heat-melting fiber yielded 12.5, 120, or anywhere between, the synthetic pulp would follow at a 5.38 to 51.43 parts, as the ratio of synthetic pulp to heat-melting fiber has been set within the teaching of Tsukuda et al.)

\*\*\*As to claim 50, as previously stated, Tsukuda et al. teach that a wet sheet is obtained [from the organic fibers] (col. 6, lines 66-67; col. 7, lines 1-5), thus indicating wetlaying of some sort. It is noted that the separator using a polyvinyl alcohol (gelling

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resin) is uniform (col. 60, lines 34-36). Accordingly, the product is taken substantially uniform with respect to the gelling resin in the separator, barring specification as to what constitutes "substantially uniformly present." However, Tsukuda et al. does not mention that a splittable composite fiber is used to provide the gelling fiber. If it is shown that the use of a splittable fiber to provide the gelling fiber changes the structure of the final product, Tsutsui et al. is further relied upon to show why the use of such would have been obvious.

Tsutsui et al. teach the use of a splittable fiber using polyolefins (polyethylene and polypropylene are the two embodied components), wherein ethylene-vinyl alcohol copolymer (gelling resin) is added to at least one of the components in a battery separator (para 0001 and 0009-0010). The motivation for using the splittable fiber taught by Tsutsui et al. in the battery of Tsukuda et al. is that such a fiber is easier to split, and a fine fiber is easily formed by splitting, thus making it producible using less pressure and solving problems like deterioration of uniformity of the fiber structure and opening of the penetrated part, thus resulting in good surface qualities and uniformity (para 0061-0062). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use the splittable fiber of Tsutsui et al. in order to have a sheet that is easier to make (as less pressure is required to be applied) and in order to solve problems such as deterioration of uniformity of the fiber structure and opening of the penetrated part, resulting in good surface qualities and uniformity. Furthermore, since Tsutsui et al. teach of using a splittable fiber in a battery separator (wherein the materials used to make up such a fiber (polypropylene,

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polyethylene, and a polyvinyl alcohol) are used in Tsukuda et al.), it would have been obvious to one having ordinary skill in the art at the time the invention was made to use such a splittable fiber, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EUGENIA WANG whose telephone number is (571)272-4942. The examiner can normally be reached on 7 - 4:30 Mon. - Thurs., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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